

## CLAIMS

1. An apparatus for reflecting an incident millimeter-wave beam comprising:  
a first layer of dielectric material adapted to receive and partially transmit said  
incident millimeter-wave beam and

5 one or more additional layers of dielectric materials disposed in alignment with  
said first layer, each additional layer partially transmitting a wave received through a  
previous layer and a thickness of each layer being such that transmitted waves  
substantially cancel in the forward direction.

2. The invention of Claim 1 wherein said dielectric materials are optically  
transparent.

3. The invention of Claim 1 wherein said layers are alternately constructed from  
first and second dielectric materials.

4. The invention of Claim 3 wherein said first dielectric material is optical  
sapphire.

5. The invention of Claim 3 wherein said second dielectric material is air.

6. The invention of Claim 4 wherein the number of sapphire layers is seven with  
six layers of air in between.

7. The invention of Claim 6 wherein outer sapphire layers have a nominal  
thickness of 70.8 mils, inner sapphire layers have a nominal thickness of 30.4 mils, and  
air layers have a nominal thickness of 32.0 mils.

8. The invention of Claim 5 wherein said apparatus further includes spacers for

enforcing the correct thickness of layers of air.

9. The invention of Claim 8 wherein said spacers include vents for removing gaseous contaminants.

10. The invention of Claim 5 wherein said apparatus further includes a sealed housing.

11. The invention of Claim 10 wherein said sealed housing is filled with dry nitrogen.

12. The invention of Claim 10 wherein said sealed housing includes a gas fill port for inputting gas.

13. The invention of Claim 10 wherein said sealed housing includes a gas exhaust port for outputting gas.

14. The invention of Claim 10 wherein said sealed housing includes baffles for directing the flow of gas.

15. An apparatus for reflecting an incident millimeter-wave beam comprising:  
a first layer of dielectric material adapted to receive and partially transmit said incident millimeter-wave beam;

one or more additional layers of dielectric materials disposed in alignment with  
5 said first layer, each additional layer partially transmitting a wave received through a previous layer and a thickness of each layer being such that transmitted waves substantially cancel in the forward direction;

a sealed housing for said layers with a gas fill port, a gas exhaust port, and baffles for directing gas flow;

10 a T and filler valve attached to said gas fill port;

a pressure gauge attached to a first nozzle of said T and filler valve;  
dry nitrogen applied to a second nozzle of said T and filler valve; and  
a cutoff exhaust valve attached to said gas exhaust port.

16. A method for reflecting an incident millimeter-wave beam including the steps of:

receiving said incident millimeter-wave beam with a first layer of dielectric material which partially transmits said wave and

5 propagating said transmitted wave through one or more additional layers of dielectric materials disposed in alignment with said first layer, further including the step of partially transmitting through each additional layer a wave received through a previous layer whereby waves transmitted therethrough substantially cancel in the forward direction.

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